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☞See advertisement on last page.

Poetry.

THE FISHERMAN.

BY JOHN SAXE.

There lived an honest fisherman,
I knew him passing well,
Who dwelt hard by a little pond,
Within a little dell.
A grave and quiet man was he,
Who loved his hook and rod;
So *even* ran his *line* of life,
His neighbors thought it *odd*.

For science and for books, he said
He never had a wish;
No school with him was worth a fig,
Except a "school of fish"
The single minded fisherman
A double calling had—
To tend his flock in winter time
In summer fish for shad.

In short this honest fisherman
All other toils forsook,
And though no vagrant man was he,
He lived by "*hook and crook*."
All day that fisherman would sit
Upon an ancient log,
And gaze into the water, like
Some sedentary frog.

A cunning fisherman was he,
His *angles* were all *right*,
And when he scratched his aged *poll*
You'd know he'd got a *bite*,
To charm the fish he never spoke,
Although his voice was fine,
He found the most convenient way,
Was just to "*drop a line*."

And many a "gudgeon" of the pond,
If made to speak to-day,
Would own, with grief, this angler had
A mighty "*taking way*."
One day, while fishing on a log,
He mourned his want of luck,
When suddenly he felt a bite,
And jerking—caught a *duck*.

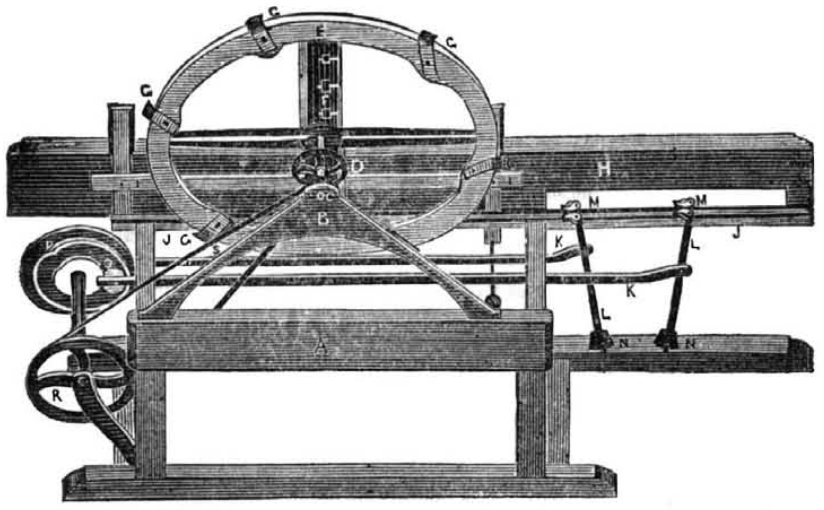
Alas, that day the fisherman
Had taken too much grog,
And being but a landsman, too,
He couldn't "*keep the log*."
In vain he strove with all his might,
And tried to gain the shore;
Down, down, he went, to feed the fish
He'd baiten oft before!

The moral of this mournful tale
To all is plain and clear;
A single "drop too much," of rum
May make a watery *bier*,
And he who will not "sign the pledge,"
And keep the promise fast,
May be, in spite of fate, a *stiff*
Cold water man at last!

How to Catch Rats.

A Yankee has just invented a method to catch rats He says: locate your bed in a room much infested by these animals, and on retiring put out the light. Then strew over your pillow some strong smelling cheese, three or four red herring, some barley meal or new malt, and a sprinkling of dried codfish. Keep awake till you find the rats at work, *and then make a grab.*

IMPROVEMENT IN PLANING MACHINES.



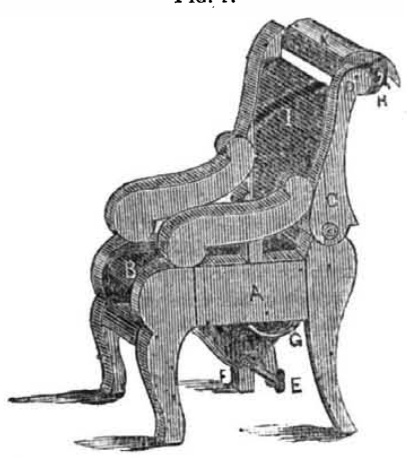
This is an improvement on the Bramah machine, presented by Mr. D. Barnum of this city, who has taken measures to secure a patent.

DESCRIPTION.—Letter A, shows the main frame; B, the standard for the support of the shaft C, upon which is seen the driving pulley D, and the face disk E, with two long or broad smoothing knives or finishers F F, the edges of which are in a line at right angles to the axis C. The finishers are placed within the radius of the guage cutters G; of them there are six more or less, for the purpose of taking off the surplus thickness preparatory to the action of the finishers. H, is a curved fence the lines of which diverge from a parallel line with the face disk, from the middle of the disk to the end of the machine each way. I and J, are guages fitted with a tongue and groove to correspond with the edges of the board and adapted to the curve of the fence so as to hold and spring the board to be planed around the curve as is passes through the machine, an effect which cannot be produced by pressure rollers, as the end of the board, after leaving the first roller would run into the back part of the wheel and be destroyed. K K, are connecting levers between the uprights L L, and the double cams P, (one only of which is seen.) M M, are eccentric clamps on the top of rocker feeders L L, attached to the frame by a pivot vertical axis at the rocker or curved bottom N N. These rockers are so graduated in curvature as to give a parallel motion to M M, as they operate on the board alternately, thereby giving it a uniform progressive motion. R and S, is a pulley and band to operate the feed motion.

The above cut and description exhibit improvements in the Bramah Planing Machine, which from practical operation has produced work, we are told, both in quality and quantity surpassed by no other machine. It is well known that there is great legal contention respecting planing machines. In respect to this one, we express no opinion, and only refer our readers to the opinion of Judge Kane, to be found on page 110 No. 14, this vol. Scientific American, and judge for themselves.—The opinion of the Judge is an able one, and he decided that there is a substantial difference between the face disk and the cylinder of the Woodworth patent. The knives on the disk he classifies as "chisel planes"—those on the Woodworth planing wheel as "adzes"—the one operates by shaving the surface—the other by chipping. The cutters on the Woodworth planing machine are essentially a series of adzes. "They cut," he says, "with a dubbing motion, cutting in *vertical curves* like the adze not in plane surfaces—like the chisel plane and its combinations by Bentham, Bramah and Muir." The meaning of the Judge respecting "cutting in vertical curves," must be the curves described by the knives passing through the vertex of the cylinder. This is a subject of great importance to the public, we therefore request attention to Judge Kane's opinions on the page referred to. In this invention, we behold the conversion of the *face plate machine*, (hitherto said "to be of little worth,") into a useful and most effective planing machine, exhibiting both skill and genius in constructive mechanism. More information may be obtained by letters addressed to the inventor, post paid, 9th Avenue, corner 24th street.

Improved Dental Chair.

FIG. 1.



This is a very excellent improvement in a Dentist's Chair, invented by C. H. Eccleston, Genesee st., Utica, N. Y. The nature of it consists in adapting the seat to persons of different sizes, also in setting back the head to any angle, and the back likewise.

Fig. 1 is a perspective view, and fig. 2 a side section of the joint spring that operates the back of the chair. A, we will call the body of the chair; B, the seat; I, the back attached to the body of the chair by a spindle C. passing through it to allow it to be thrown back by a spring which passes through an eye regulated by a set screw, see

FIG. 2.

K, is the head cushion attached to the sides of the back by an axis E. On the axis is a ratchet wheel and on the cushion frame a ratchet which holds the cushion, and also allows it to be turned round to any angle, so that the head may be inclined or held upright, as desired. The bottom is raised or lowered as follows. F, is a vertical rod in the bottom of the chair passing down between two cheeks; in the side of one of them is a set screw E, which will hold F at any point to which the bottom of the chair may be pushed down. G, is a steel spring, (there is one on each side) attached to the bottom of the chair, and turned at the lower end over a rod passing through the upper part of the cheeks which are attached to the body of the chair. The springs therefore, have their tension upwards and the set screw E, is to hold the bottom down. For simplicity, and perfect adaption to the wants of Dentists and the ease of patients, this chair cannot fail to please.

RAILROAD NEWS.

Atlantic and Pacific Railroad.

Gen. Houston has moved in the Senate for an inquiry into the expediency of a railroad over the continent from the Mississippi, via the South Pass of the Rocky Mountains to San Francisco, for the transportation of military stores, troops, etc.

Cheshire Railroad.

The New Hampshire Sentinel says that Mr. Upton an engineer on the Cheshire Railroad has invented a new and useful improvement on the snow plough and cow catchers to clear the ribs behind the plough.

The Railroad between Saratoga and Whitehall, N. Y. is now in full and successful operation. We hope that the line to Troy is laid with new rail, there was assuredly great need of such a reform.

The route for a Railroad from Auburn, N. Y. to Binghampton, to intersect the New York and Erie line has been surveyed, and a very favorable report made—the distance is seventy miles.

A Railroad is now constructing from Pittsfield, Mass. to unite with the Housatonic line, whereby passengers from that place will be enabled to reach this city in 7 hours.

It is said that considerable embarrassments are thrown in the way of the New York and New Haven Railroad by the Hartford Railroad. We hope that this will not last long. It is not wisdom to oppose the direct travel between this city and Boston, for assuredly it will ultimately bear down all obstacles.

The Reading Railroad, Pa. is said to be in a bad condition in its financial affairs.

Plank Roads are in progress in many parts of Western New-York and measures are being taken for their construction from the village of Ballston Spa to Jamesville and Mount Pleasant; also from Saratoga Springs to Jessup's Landing; and through Clifton Park. A company is already formed for constructing one from Schenectady to Saratoga Springs, passing through Ballston.

Morse's Telegraph line to Philadelphia is now in operation, from the office in Hanover street this city direct to Philadelphia. The wires cross the Hudson just above Fort Washington, at an elevation of about 200 feet.

Sleighing with a Tiger.

A novel exhibition was presented in Boston last week. Herr Driesbach made his appearance in an elegant sleigh with his pet tiger by his side; not the tiger of English comedies, but a bona fide four-legged tiger. He seemed to enjoy the sleighing highly and leaped upon his master, licking his face and showing other sighs of excitement. Driesbach had to slap him several times to keep him off. After astonishing the city, Driesbach alighted with his tiger at the Tremont House, and taking him into one of the apartments invited gentlemen to walk in and be introduced; but there were few who seemed anxious to avail themselves of the opportunity.

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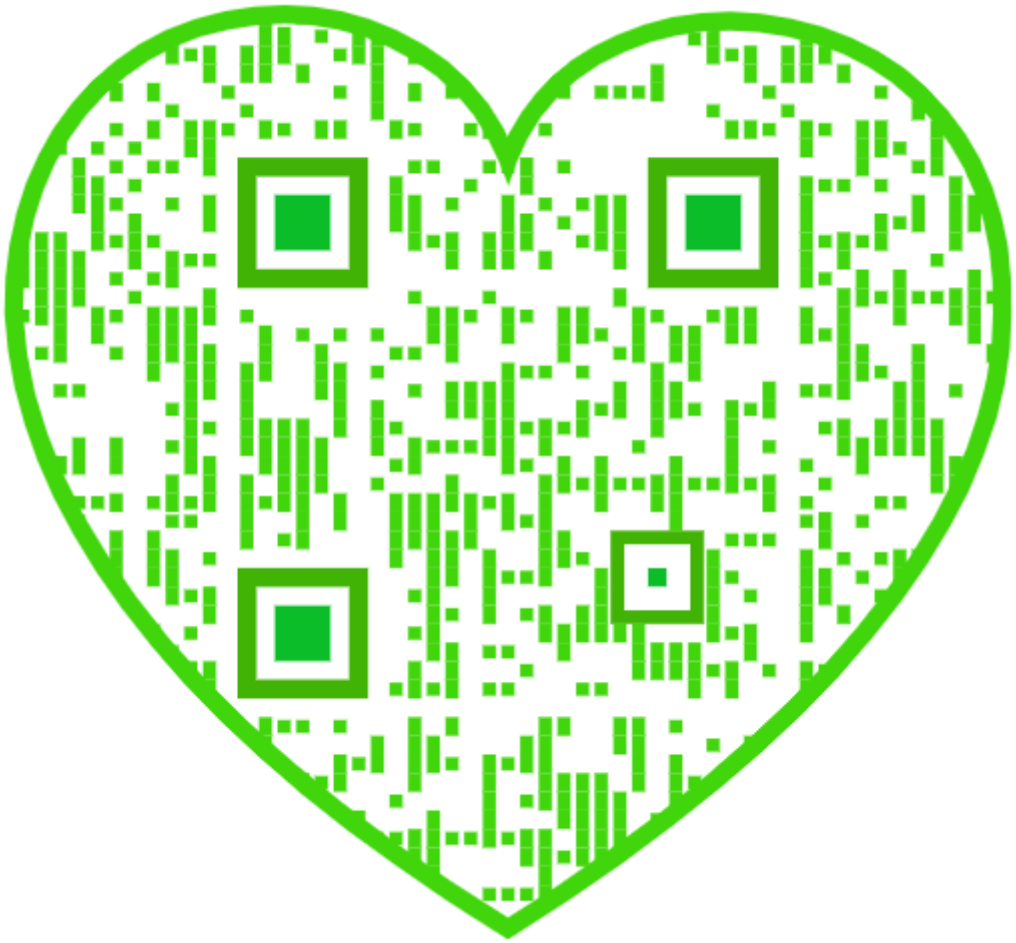

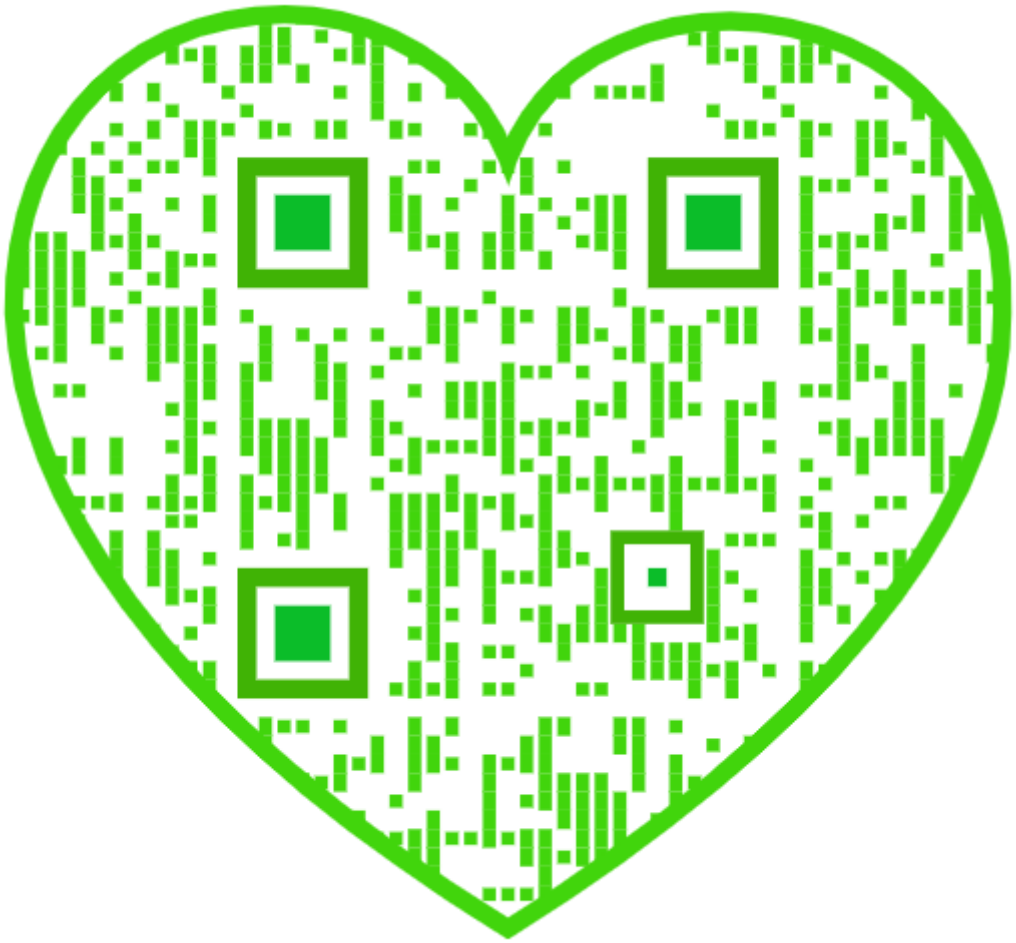

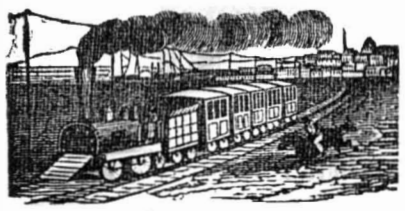

Late News from Europe.

The strange news by the America of a Napoleon being more than *First Consul* of France is certainly something that no one could have dreamed of this day twelvemonth. He who would have predicted this event on the 1st of January 1848, would have been looked upon as indulging in imaginary vagaries "compared to which the most immoderate flight that poet ever took when warmed with wine was moderate conjecturing." Well, so goes the world—full of ups and downs. Prince Louis has more talent than many give him credit for, but who can prophecy about France or Ireland. The Celts are entirely out of the reach of prediction, and they seem to be the whole subjects of it—what a lamentable waste of sagacity.

England is quiet—and Repeal is gone entirely. Concilliation Hall is sold for a church The *pope* is a refugee in the Kingdom of Naples. The Austrians and Hungarians are fighting fiercely. There is no hope for Hungary. Artillery now wins every battle, if the combatants are equal in other respects. There are $15,000,000 of gold in the Bank of England—nothing to old California—we are going to buy St. James, Buckingham palace, and the Tower of London, some of these days when our California returns come in.

We hope that a place will be provided for them in the Smithson Institute. They would make a fine show for our Kentucky cousins, who are all princes in themselves.

Climate of the Gold Region.

The gold region of California (according to Col. Fremont) is in the Sacramento river and its tributaries. The climate of the country has no winter in the valley, but the rainy season and the dry. The rainy season begins in November aud continues to the middle of February or the beginning of March ; the rest of the year is without rain, but the streams from the Sierra Vevada afford all the facilities for irrigation in the heats of July and August. The whole valley abounds in wild cattle, wild horses, elks, deer, antelopes, grizzly bears, patridges, water fowl, salmon, &c. All the products of the States from apples to oranges, from potatoes to sugar cane, may be produced in the valley of the San Joaquin and Sacramento. The climate is remarkably healthy.

Such is the California on the Pacific, one of the richest, most picturesque and beautitul regions for its extent, upon the face of the earth.

Mechanics Associations.

The Annual Meeting of the Maryland Institute for the promotion of the Mechanic Arts, took place on the 10th inst. Joshua Vansant was chosen President, and H. Hazlehurst, Corresponding Secretary.

On the evening of the 16th. inst. the Hon. Zadoc Pratt, was inaugurated President of the Mechanics Institutes of this city, and delivered on the occasion an address characterized for good sense without rant, and exhibited a fund of sound information without ostentation. We hope to see this old Institute re-energised, so that it may flourish again like a green bay tree.

The mechanics of Rochester had a grand banquet on the 28th of last month, and the mechnnics of Bolton had a grand supper on the evening of the 8th inst. at the Bolton Depot of the Baltimore and Susquehannah Railroad. At the present moment there seems to be great mental activity among our mechanics—and a corresponding unity of feeling for mutual elevation. We hail these things as anspicious omens for future good.

Masses of golden rocks are said to have been found in the California mountains. One man found a lump weighing 250 lbs. The American fleet in the Pacific are ordered to rendezvous at San Francisco to protect the treasures.

LITERARY NOTICES.

American Condensing Steam Engine.

We are happy in being able to bring before the American public a production long desired by persons of scientific taste and all those interested in the wonders of tho Steam Engine.

We have just published a work which comprises the most splendidly colored mechanical lithographic plate, that has ever appeared in this or any other country. It is 38 by 28 inches in size,—two distinct drawings with parts in elevation and section, all strictly accurate, of a condensing engine as applied to our river boats. All the internal parts are presented at once to the eye, and are described by reference in a very neat pocket volume of 44 pages. We have no doubt but this production will be found to be the most correct chart on the Steam Engine, for machine shops, colleges, academies, and schools ever presented to the public. The drawings are so large and so beautifully illustrated that they will form the most perfect diagrams for explantion in lectures.

The work complete is published and sold at this office, Munn & Co., 128 Fulton st.—Price $3. The drawings are worth $5, and could not be purchased executed by hand for less than $20.

The author and draughtsman is Frederick Cook, of our city, who has obtained very many testimonies from scientific professors and engineers to the extra accuracy of his production.

American Phrenological Journal.

This Journal has commenced a new volume with the New Year. It has now reached its 11th volume and is adding yearly to its subscription list—no less by the nature of the subjects on which it treats than by the chastity of its style and the general usefulness of its matter. This number contains a very excellent wood cut of W. C. Bryant, the first of American poets, also a phrenological dissertation on his organization, by Mr. Fowler. The writings of Mr. Fowler, are of such a kind, that we are frequently compelled to say "almost thou persuadest us to be a phrenologist.

The Ohio Cultivator.

This valuable semi-monthly periodical has commenced its 5th volume, and it should certainly be in every Ohio farmer's house, not only on account of its low price, $1 per ann., but its practical value as a work of thorough practical information. It is published at Columbus, Ohio.

Elements of Agriculture.

This is a very useful little work for schools, translated from the French by F. G. Skinner, and published by Carey & Hart, Philadelphia. It is arranged in different lessons with questions at the end of each chapter. It is a very simple, clear and truly valuable book. In it will be found much to instruct not only the young, but the old, and it should be in every farmer's library.

Habits of Whales.

It is stated that Lieut. Maury, of the National Observatory, has come to the conclusion that the whales in the Pacific Ocean have particular resorts at certain seasons of the year where the whalers may generally expect to find them.—as the shad, and salmon, and herring, and other fish are generally found. He is endeavoring to work out this conclusion, and fix the localities of the resort of the whale by the aid of all the multifarious logs of whalers. If he should succeed it will be of vast importance to the whaling interest, as it will reduce the expence of the outfit of a whaler, shorten the length of the voyage, and increase the probability of finding whales almost to a certainty. These are grand results to achieve, and should Lieut. M. be successful, will bind an unfading wreath to his brow.

A Great Diamond.

Koh-i-noor—or, "mountain of light."—A diamond of inestimable value has been taken by the British troops in India, from one of the native princes. It is proposed to have it inserted in the centre of Queen Victoria's diadem.

We are indebted to the Hon. J. Dix, U. S. Senate for Congressional Documents.

For the Scientific American.

New Motion Regulator.

All motion governors now in use, are dependent upon a change of velocity in the machinery for their effect:—in order to increase the power, there must be a decrease of velocity and visa versa. I have invented a Regulator which operates before a change of velocity has occurred, and depends for its effects upon a change of resistance, or a change in the strain upon the machinery, caused by an increase or decrease of resistance. To take advantage of this change, I place a spiral or other spring at any convenient point in the shafting between the moving power and resistance, in such a manner to be compressed to some extent with every increase of resistance to the machinery. The most convenient manner of attaching the spring is to divide the main shaft, and upon the contiguous end place cranks in such a manner that one will turn the other, and place a spring between them. It is obvious that the extremities of the cranks will approach and recede from each other with every change of resistance in the machinery. This motion is easily communicated by levers or otherwise to a sliding collar on the shaft. By attaching a lever to the collar I am enabled to communicate any desired amount of motion and power to the steam valve or water gate, and consequently get an increase or decrease of steam upon the piston before a change of velocity has taken place in the balance wheel, and always in exact proportion to the work to be done, and that without contemplating, beforehand, a change of velocity. My invention consists in regulating the motion of machinery by the change in the strain upon the shafting caused by the change of resistance to be overcome by the machinery, this effect to be taken advantage of by a spring attached to the shafting in any convenient manner, in combination with a steam valve or water gate. So far as described the invention does not take into account the change of pressure in the boiler. I regulate the supply of steam to the engine by means of the expansion and contraction of metal,—which I effect by pressing a metallic rod into the steam, and connecting the same with the steam valve. I have found the heat of steam to be according to its density, or pressure.—An increase of pressure expands the rod by increasing its heat, and partially closes the valve, and vice versa.

DR. R. F. STEVENS.

Syracuse, N. Y.

Large Casting.

On Friday week about 2½ o'clock P. M. a number of persons assembled at the Novelty Works of Messrs. Stillman, Allen & Co. foot of Twelfth-st. E. R. to witness the casting of a Bed-Plate for the new Steamer Atlantic, now on the stocks. About 10 o'clock A. M. the furnaces were in full blast, charged with 50 tons of iron. Everything being in readiness by 2 o'clock the molten metal was allowed to run from the furnaces through the channels, or conductors to the mould; two minutes sufficed and the fiery flue flowed hissing on, emitting showers of bright scintillations in its course. A large quantity of the metal overflowed the channels, but the loss was afterward supplied by pouring more through the vents. The size of the casting is 32 feet in length by 9 in width, and 8 in depth or thickness, and its estimated cost is $4,000.

The following are the dimensions of the steamer Atlantic: Length from stem to stern 290 feet, breadth over all 46 feet, and depth of hold 32 feet. The engine has a 95-inch cylinder, and 9 feet stroke. Cost of machinery alone $225,000; and $500,000 will have been expended in the completion of the vessel. The company calculate on having her ready for launching in 2 or 3 weeks. The line to which this steamer belongs will be entitled the "New York and Liverpool line of Mail Steam-packets," of which Wm. H. Brown is the builder and E. K. Collins, Agent.

Turkeys are selling at Chicago for 37½ cts. each. The market is stocked with venison and prairie chickens, which are selling very low. Why don't they send along a lot here.

Potatoes of no great quality are selling in this city for $1 per bushel.

What our Contemporaries think of us.

THE SCIENTIFIC AMERICAN.—This is a valuable paper. We hardly know how to speak of it in terms corresponding to its merits. We refer the reader to the Prospectus on the last page of our paper. We have several numbers of the paper at our office which we shall be happy to show to any of our friends who may wish to examine them.

It is an invaluable, and we think, an indispensable companion to the Mechanic, Manufacturer, Artist, Artisan, Inventor and man of Science.

But all should read it, as it opens the arcana of Nature, and displays to view her secret powers. It contains that kind of knowledge which must be more widely disseminated among the people, or all our preaching, writing and lecturing about reform and progress, will be useless. The wicked monopolies of which society justly complains, originate in the advantage that Knowledge possesses, and ever will possess over Ignorance. As in the days of old, the knowledge of Nature and her mysteries enabled the priests of Egypt to keep the mass of the people in superstitious bondage, so, in modern times, a like knowledge enable the "knowing ones" to lord it over their brethern. Give the people the "Key of Knowledge," and they will soon understand and carry into practical effect the principle that the discoveries of Art and Genius are not intended by the All Wise for the benefit of a particular class, but for the common good of all his children.

We hail as the harbinger of the dawning day the fact that cheap publications on Science and Art are getting into more general circulation. Among such publications, the Scientific American stands pre-eminent.—*People's Platform, Zanesville, O.*

[The above flattering notice comes from a contemporary who sees deeply into the moral causes which can elevate the working classes, and we know of no paper that labors more assiduously for the interests of all classes than the "People's Platform." Moral and Physical Science must go hand in hand—they are twin sisters, which if separated, both languish and pine, but when united health and beauty blossom around them. We appreciate the voluntary notice of our worthy friend.

New Lubricating Oil.

Mr. Devlan of Reading, Pa., the inventor of the oil saver, has discovered a new lubricating material for machinery, which is equal to sperm in point of durability and answers as good if not a better purpose. We have given it a fair trial and cannot but speak highly of its merits. It costs only 75 cents per gallon. It has been tested by some very eminent engineers in large establishments in Pa., who give it a high character. Messrs Kenedy and Gelson, No. 5 Pine st., are the agents for this city.

Black Lead in Pennsylvania.

We learn that an enterprising company from Philadelphia have commenced digging for Black Lead or Plumbago, at the old mine on the farm of Edmund Plumy, in Southampton, Bucks county. This mine was worked some years since by William Rodman. Esq., of Bustleton, and others, and a large quantity of Black Lead taken out, most of which was exported to England, but owing to the low price of the article, the digging was discontinued. At the present time, we are informed the increased demand for Black Lead, and the consequent high price, offer sufficient inducements for working the mine again, which is to be carried on with vigor, some of the best miners in the country having been engaged.

The Black Lead from this mine is of a superior quality, and is reported to be the purest found in this country or Europe.

Curious Case of Poisoning.

A gentleman well known in this city came near meeting his death on Friday last week at his residence in Pelham, Westchester Co. form eating heartily of pheasants. The birds were taken on Long Island and had probably fed on poisonous berries, which do not affect the birds, but those who eat *them*. This often takes place at certain seasons of the year, by eating patridges. An emetic is the first thing that should be tried.

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Geology.

In a lecture recently delivered in the Tabernacle this city, by Dr. Boynton he took the old ground that this old mother earth was once a red hot lump of matter and by cooling a crust of granite was formed which contracted upon the melted mass within, and by means of this contraction it either collapsed, forming the beds of lakes, or protruded outward and upward, forming elevated planes and mountains, thus forming both the lowest and the highest in its position of all the geological formations.

He said that cracks or seams were opened transversely across the spurs or chains of the mountains, extending quite down to the fluid mass beneath. Then, by a subsequent pressure of that mass, an infusion of melted minerals was injected into those openings, forming the traps, bassaltic and porphyritic rocks. The melted material came from a deeper source than the original Granite, being of a somewhat different composition, and thus were formed the dykes or veins which pervade the Granite rocks. Sometimes these trap rocks themselves have again been broken by internal agitation and the openings filled by material of a still different character, and doubtless from a still lower source, bringing alone with him the precious or the baser metals which from their specific gravity would sink lowest in the melted mass beneath.

The stratum of rocks which lies next above the original Granite is Gneiss, in which there is a layer of about 7,000 feet surrounding the whole globe, where the rocks are found in their geological position. This rock is composed of the same materials as the Granite itself, but the Granite has been disintegrated and recompacted into rock. How did this decomposition take place? Doubtless by the action of water upon the heated surface of the Granite. When the shell of the earth first began to get cool and harden, the temperature at the surface must have been such that the water, which now constitutes our ocean, could only have existed in the form of an extremely attenuated vapor, but with the process of cooling and when the proper temperature was attained this vapor condensed into the form of water, and coming in contact with the still heated surface of Granite rock would crumble it into power, which would be deposited in a horizontal and stratified condition at the bottom of the ocean, and being again acted up by the heat from beneath would be hardened into rock. Thus were formed the Gneiss rocks, which may be described as a secondary and stratified Granite.

The component elements of Granite are mica, felspar and quartz. All these elements recombine in the gneiss as would be the case if the *detritus* of the original granite was undisturbed by the action of currents, but under the action of currents these various materials would be separated, and by the principle upon which sand is washed from gold, the lighter portions would be floated off to a distance and deposited by themselves, where their specific gravity overcame the force of the current.—Thus these same elements, separated from each other, formed several new species of rocks lying above the gneiss, alternating in their relative positions. These are the mica slates, hornblende, quartz and clay slates—those substances which, from their specific gravity, would be held longest in suspension by the water, being last deposited, and thus forming the upper strata of the metamorphic group of rocks.

The rocks described, being first formed and older than others have been subjected to a greater number of the convulsions of nature, and are consequently found tilted on their edges, and distorted into every possible position.

Beside the thousands of extinct volcanoes on the surface of the earth, there are existing at at this day more than three hundred that are now active, and have from time to time, within the period of the history of man, emitted forth masses of fluid matter, sometimes in quantities sufficiently large to form immense rivers of melted lava, extending in some instances a hundred miles in length and twelve in breadth, melting down hills and filling up valleys in their course, and building out the coast for several miles into the sea, setting the ocean boiling, so that thousands of fishes have risen to the surface and been thrown up on the shore by the waves of the heated and angry ocean actually cooked and ready for the palate of the epicure.

The crater of the great volcano of Owyhee is so large and deep that the whole city of New York and all its suburbs might rest upon the surface of a lake of boiling rock, which is more than three miles in extent, some twelve hundred feet below the edge of the crater; or upon the red-hot crust of the lake, which like a thin sheet of ice over a flowing tide, is constantly rising or falling. The Mountain of Jorullo, in Mexico, was thrown up in a fluid state less than 100 years ago, to the height of 1,600 feet, and has not cooled off yet while the foundations of other high mountains have given away, and they have fallen through the crust of our Planet, their former locations being now filled by the limpid water of quiet lakes. The breaking through of the floor of the ocean and its elevation hundreds of feet above its surface, producing islands in a day, at various points—the elevation of more than 1,000 miles of the Coast of South America by the throb of an earthquake—the gradual depression of the coast of Norway and the corresponding elevation of the other to the height of some 200 feet carrying with it the remains of animals of species now inhabiting the Ocean, and many other similar phenomena are sufficient to convince us that the Earth is still fluid at the centre and that the perpetual mountains, and the everlasting hills instead of being based upon a solid underpinning rest upon a yielding foundation.

The same fact is shown likewise by the phenomena connected with the boring of Artesian wells, and the sinking of mines, the temperature constantly increasing about one degree for every 45 feet of descent.

At this rate water would be at the boiling heat at a little more than one mile from the surface of the earth and at the same ratio of increase every known substance would be in a fluid condition at less than fifty miles below the surface. Now should we allow the crust over the fluid mass of the earth to be 200 miles in thickness and then contrast the globe with an egg, it will be found that the shell of the egg is full five times thicker in proportion to the diameter than the crust of our planet.

In theory the Doctor agrees with the old Geologists, whose systems are described in Goldsmith's Animated Nature.

Effects of Machinery.

The time is coming when nearly every product of industry, will be made by machinery. If we look back upon the advances of the last twenty years, we may form some estimate of twenty years to come. In a short period, machinery will have made tremendous invasions on human industry. We have machines to make brick, and to hammer stone. There are machines for knitting stockings, sewing pantaloons, and turning marble statuary. We shall have steam ploughs and cultivators, and our crops will be sown and gathered, as well as thrashed and ground, by steam, or some other equally potent power. Men will do little more than to oversee and enjoy the immense products of machinery. But in order to do this, machinery must be owned by associations or companies of the people.

The people are destined either to the enjoyment of boundless wealth, or to a terrible poverty and slavery. It all depends upon their own intelligence and manhood. If they know their rights, and are determined to have them, there is no power in the world strong enough to prevent them. Machinery will elevate or crush.

And why should not the workmen unite and enjoy both the benefits of capital and labor? We know that it is difficult for them to find the funds, and it is easy to say "add your capital and labor together." Nevertheless let them do what they can. The first thing wanted, is a confidence in the integrity of all those who unite—an honesty that each will do his share, and act for the general benefit. Let there just be the right spirit of such associations disseminated and many will soon spring into existence. Machinery is a general benefit where it is rightly directed. The sufferings of the operatives in the manufacturing districts of Britain, is not owing to machinery, but to the wrong direction of its benefits. The highest state of civilization we could desire to see, is the power and possibility in our good country for every family to cultivate their own land—raise their own food, and make their own clothing, with such improvements in domestic machinery as will reduce the hours of labor for all, to that limit which will conduce to health and give time to improve the mind—to supersede by a highly cultivated rural life, the necessity of manufacturing corporations. Let inventors who would benefit mankind direct their genius and attention to the improvement of portable machines.

The Tea Plant.

Mr. Junius Smith who has charge of some British Tea Plantations in Assam, in the East Indies, is now in one of our Southern States with a view to cultivate it here.

The tea plant, which in China, is a shrub, grows native in Assam to the height of 30 and 40 feet. But for plantation use, it is necessary to trim it, so that it shall not grow over five or six feet, to place the leaves in reach of the gatherer. With Yankees it might be allowed to grow much higher.

Green and black teas are made from the same plant, the difference being owing to the manner of curing, though some leaves are allowed in making black tea which would be rejected in green, because of their being a little too old. The wood of the tea bush is light colored and close grained, and it smells, when peeled, like the black currant. The flowers are white and fragrant. It is very leafy. The green leaf is bitter, pungent and unsavory.

The tea plant is remarkably hardy, and it flourishes on the high slopes of mountains, where frost and snow prevail three months in the year. Its favorite soil in China and also in Assam, is the poorest yellow sandy loam, with carbonate of iron in analysis.

In planting, cuttings do well. But usually several seeds are, when gathered, put at once into shallow holes four feet apart, and allowed to grow up bushed. In four or five weeks the germ appears above ground. It grows about a foot every year. In the third year they begin to gather the leaves, nipping off the end bud so as to restrict its height and breadth. It is desirable to select hillside ground, where the sun shines about half the day. 2000 trees are allowed to the acre. The tree lives to the age of fifty years.

The process of manufacture consists in oft repeated exposure of the leaves in well-heated iron vessels, with quick and accurate manipulations, till the pungent oil is extracted from them, and in dexterously rolling them in ball masses, to curl the leaf as we see it.

Facts in Physiology.

A man is taller in the morning than at night to the extent of half an inch, owing to the relaxation of the cartilages. The human brain is the 28th of the body; but in the horse only the 400th. Ten days per annum is the average sickness of human life. About the age of 30, the lean man generally becomes fatter, and the fat man leaner. Richter enumerates 600 distinct species of disease in the eye. The pulse of children is 180 in a minute, at puberty it is 80: and at 60, it is only 60. Dr. Lettom ascribed health and wealth to water, happiness to small beer, and disease and crimes to spirits. Elephants live 200, 300, and even 400 years. Bats in India are called flying foxes, and measure six feet from tip to tip of their wings. Sheep, in wild pastures, practice self-defence by an array, in which rams stand foremost, in concert with ewes and lambs in the centre of a hollow square. Three Hudson's bay dogs draw a sledge loaded with 300 lbs. fifteen miles in a day. One pair of pigs will increase in six years 119,160, taking the increase at fourteen times per annum. A pair of sheep in the same time would be but 64. A single house fly produces in one season 20,080,327 eggs.—The flea, grasshopper, and locust jump 200 times their own length; equal to a quarter of a mile for a man.

A Droll Phenomena.

The Singapore Free Press, East Indies, of September 14, gives an account of a strange phenomena that occured at Chantibun in the eastern part of the kingdom of Siam on the 13th of May last. First a violent shock of earthquake was felt accompanied with tremendous noise and subterranean roaring. The doors and partitions of the houses were cracked and strained. But more extraordinary than all, it says: "During the shock, there spontaneously came out of the ground a species of human hairs in almost every place—in the bazaars, in the roads, in the fields and the most solid places. These hairs, which are pretty long, stand upright and adhere strongly to the gronnd. When they are burned they twist like human hairs, and have a burned smell which makes it to be believed that they are really hairs; they all appeared in the twinkling of an eye during the earthquake.—The river of Chantibun was all rippling, and bubbles rose to the surface, so that the water was quite white. It is thought that these hairs may have been produced by electricity. The mountains of Chantibun run nearly from north to south and are united to the system which separates Camboja from Siam."

The hairs were probably some interior bituminous substance melted and blown through the pores of the earth into fine strings and congealed, resembling hairs, as every one knows is the case with rosin, &c.

Has a Cat Nine Lives.

A most extraordinary circumstance lately occurred in Bedford, England, giving rise to much discussion and speculation. It appears that Mrs. Halhead, of Harput-place, had 3 kittens, and it was thought proper only one should be kept; accordingly orders were given that two should be forthwith drowned, and two were drowned, says our informant. The dead kittens were then buried in the garden. Six weeks afterwards a kitten was seen to come out of the ground on the spot where the two unfortunates had been buried and it was immediately recognised as one of those identical victims! To remove all doubt about the matter, the ground was turned up, and only one dead kitten was found in the hole. It is supposed that it was a case of suspended animation, and if so, it is the most protracted case of the kind that has come to our knowledge. At all events the cat is alive and well, but much smaller than its brother who did not go through the process of drowning and burying.

Storms.

In reference to violent storms, Dr. Murray says in his Treatise on Atmospherical Electricity and which he quotes in a letter from Stranraer: It appears that there has been from time immemorial on one of the bastions of the castle of Duino, situated in the Frioul, on the Adriatic Sea, an iron pike attached vertically to the wall during summer. When the weather inclines to be stormy, the soldier that mounts guard examines the iron of this pike in presenting to it the iron-shod summit of a halberd, which remains there for the express purpose; when he perceives that the near approach of the halberd causes the iron of the pike to sparkle much, or that there is on its summit a spark of fire, he sounds a bell near the spot to give warning to those who are working in the fields or the fishermen on the sea that they are threatened with a storm, and on this warning all return home. This most singular custom it appears has been the practice for centuries, and how very easy would it be for us to establish such a faithful test of the approaching storm where it might be especially beneficial, and save many lives.

For Croup or Quinsy.

For a sudden attack of quinsy or croup, bathe the neck with bear's grease, and pour it down the throat. A linen rag soaked in sweet oil, butter or lard, and sprinkled with yellow Scotch snuff, is said to have performed wonderful cures in cases of croup; it should be placed where the distress is greatest. Goose grease, or any kind of oily grease is as good as bear's oil.

Equal parts of camphor, spirits of wine, and hartshorn, well mixed, and rubbed upon the throat, is said to be good for the croup.

Severe cases of croup have been cured by the liberal application of cold water to the neck and breast, then rubbing with a coarse cloth, till a glow is produced.

Eighty one newspapers are published in Boston, of which fourteen are daily, nine semi-weekly and fifty weekly.

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New Inventions.

The Gold Washer.

Mr. H. D. Chapman of Baltimore, Md., is the inventor of the Gold Washing Machine which was noticed by our correspondent in No. 16 Scientific American. It consists of an open cylinder about five feet in length, and of twenty-two inches diameter, the interior of which is supplied with shufflers. The cylinder rests upon two small iron uprights, and is supplied at one end with a crank, by which it revolves. The soil containing the precious metal is then thrown in, and readily separated by means of the shufflers which retain the gold, whilst the residue is thrown in another direction. At one end of the cylinder, scoops are placed which afford a constant supply of water necessary for the operation. This machine has already excited considerable interest.

Improvements in Preparing Hemp.

Mr. N. L. Williams of St. Louis, Mo., has made some very important improvements in the rotting and dressing of hemp. He has recently fitted up a double mill machine for breaking, scutching and hackling some water rotted hemp for the government, which performs its work in the most rapid manner and in a carefully and well finished state. It finishes about 180 lbs. per hour. The price which the finished hemp commands is from $15 to $20 per ton, and when it is considered, that it accomplishes in one handling the work of 15 persons, its value is at once apparent.

New Vapor Engine.

A new invention called the "Combined Vapor Engine," has been exhibited in London. Its object is to produce from steam a greater motive power than is now employed In low pressure steam engines, the steam, after performing a single operation, passes off from the cylinder to be condensed, in which process it is deprived of its heat. The new invention turns this heat to account, and makes the steam perform a double operation—generating in its process of condensation, a new motive power. Chloroform is used in the process—being extremely volatile, it is converted to vapor by the latent heat of the steam, and is thus used like the steam itself. The experiment is said to have been successful, and the invention is one of great importance.

Of this *we* have *no doubt—we* see no possibility of using chloroform in any capacity to produce an economical result in mechanical propulsion. Every body almost, remembers the gas engine of Mr. Brown that made such a fuss in the mechanical world in 1825. Where is it now? "with the things that were." It is not the volatibility of a substance, that is going to make it a good propelling agent—it is its general economy, and so far as we have examined, the subject—and that is not a little both practically and theoretically, we know of no substance that can surpass coal and water.

Improvements in Paints.

Messrs. J Quarterman & Son, No. 114 John st. this city, have discovered a new drier for paints, which is far superior to any thing of the kind ever used in the art before. It works pleasantly and flows freely. Messrs Quarterman are excellent practical chemists and they have for a long time devoted themselves with distinguished success to this department of the science—a department which has been too much overlooked by the professors of chemistry, or else we surely should have improved more in the art han we have. The colors of the ancients seem to laugh at modern rivalry—even Sir Humphrey Davy's analysis of old paintings in Rome did not advance the art an inch. We hope that the gentlemen above named have (as we have been informed) discovered the true theory of compounding the different colors—something much desired.

New Locomotive Combinations.

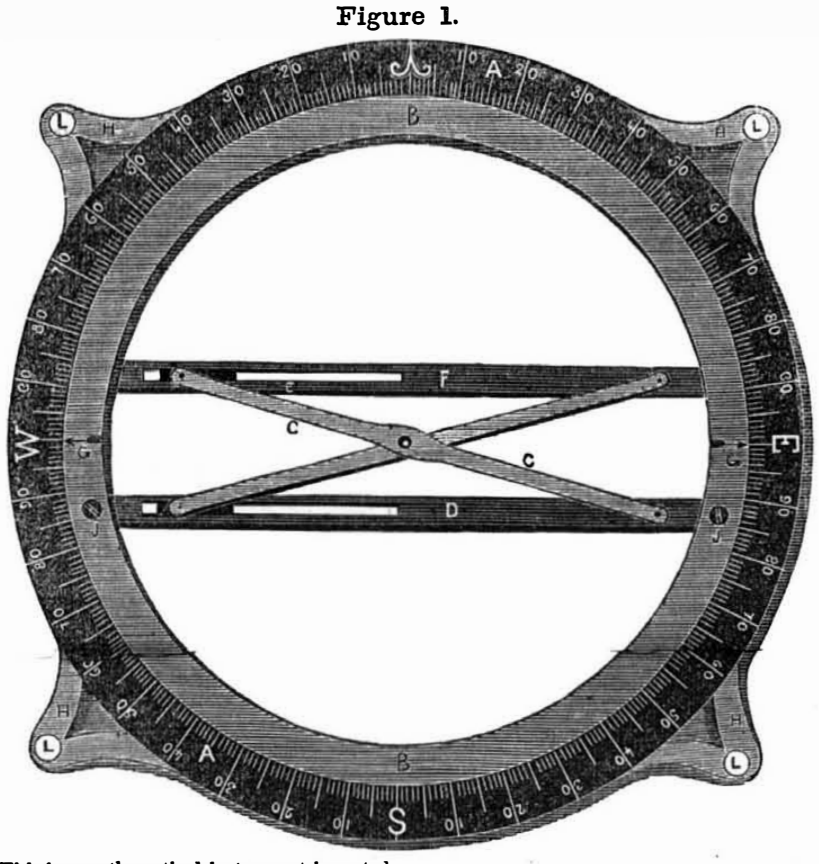
Late foreign exchanges say that a new steam carriage has been tried on the Great Western Line, England, in which the locomotive engine and a car capable of containing 60 passengers form but a single carriage. It is to be used on branch lines where but a few passengers are to be conveyed, not enough to sustain the expense of separate cars. The entire length of the carriage is 50 feet—its weight between nine and ten tons, and it has six wheels. It made from 35 to 40 miles an hour with ease The boiler is different from the common English kind, being made upon the American principle with vertical tubes, after the manner of the "Lilliputian Locomotive" invented by Mr. Samuel of the Eastern Counties Railway, and noticed in the Scientific American last summer. It is intended for the light trains to save the expense of running a large English locomotive in such cases. It would be of no benefit, we believe, on our lines, although important to English Railroad companies.

New Mode of Manufacturing Substances for Candles.

The following process has recently been patented in England for the manufacture of candles, which is something of a novelty by the way. The process is to combine resin with tallow or any other fatty or oleaginous substance in the proportion of about from 20 to 30 per cent. of resin in the combination.—When the composition is melted and well mixed together, there is to be added by degrees any description of strong acid, as concentrated sulphuric acid ; it is then to be submitted to sufficient heat to evaporate the sulphurous acid gas, which will be accomplished in about from twelve to eighteen hours ; it is afterwards to be submitted to the process of distillation well known for substances of this description, and when cold, it is to be subjected to pressure, to separate the fluid from the solid parts, which are then formed intocandles or other suitable articles for illumination, which are said to endure well and give a very brilliant light.

BAILEY'S DELINEATOR.

Figure 1.



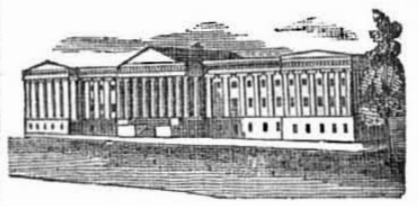
This is a mathematical instrument invented by Mr. Bailey, of Abberville, South Carolina, and patented a few years ago, but never before brought into public notice. For draughting plots of ground, charts or geometrical figures, its utility is self evident and must strike every person at a glance. Owing to the death of the inventor these instruments have never been introduced into the market. Mr. Edward S. Bailey, the son of the inventor and patentee, is desirous to have a person in this or any other city engage in the manufacture of them, and those who would desire to do so will get particular information by addressing the above named gentleman, post paid, at Abberville C. H., S. C.

Description.—The Instrument consists of two concentric circular rings or flat hoops, made of brass, one called the interior and the other the exterior ring. These are set upon feet, about one fourth of an inch in length, with a small conical pin inserted in each foot at the bottom, and a parallel rule attached to the interior ring as hereinafter described.—The same letters refer to like parts.

Fig. 2.

The exterior ring A A, is stationary, and is divided in o degrees and subdivided into parts of degrees, and marked with letters indicating the cardinal points of the compass, with a groove on its inner edge, and has projections on its periphery H H H H, near the outer end of which are feet L L L L, about one fourth of an inch in length, in each of which is inserted a conical pin to secure the paper or thing upon which the draft is intended to be made, in its place. The interior ring-shaped plate B B B B, revolves within the exterior one in the groove above mentioned. Fig. 2, is the section through the two rings A and B showing the groove *a* in the former. H is the projecting piece with one of the conical points, a foot L, upon which the instrument rests. A parallel ruler D F, is attached to the interior ring-shaped plate by screws as represented at J J, the limb D, being attached whilst that marked F, is free to move on the joints and slides C C. There are two index points marked G G, on opposite sides of the interior rings, one at each end of, and immediately above the outer edge of the extending limb of the parallel ruler F, when in contact with the outer limb D. The circular ring is made in the usual manner ; the parallel ruler may also be made in the usual manner. Each of the limbs has a slit E, in it at one end through which one end of the connecting pieces slide so as to admit of the ruler being drawn out square, and without the ends diverging from each other The circular rings are turned on the lathe for that purpose, and the degrees laid of by dividers or other dividing instrument.

The manner of using the instrument is to lay the paper or other thing upon which the draft is intended to be made upon a flat surface then place the instrument upon it, press the conical pin attached to the feet through the paper, so as to secure it in its position, move the interior ring until the indices point to the course intended to be delineated, then extend the extending limb of the parallel ruler to the point from which the line is intended to be drawn, and draw said line by that limb of the ruler the distance required.



LIST OF PATENTS

ISSUED FROM THE UNITED STATES PATENT OFFICE,

For the week ending January 9, 1849.

To A. F. Hunt, and J. S. Bradish, of Warren, Ohio, for improvement in Musical Instruments. Patented Jan. 9, 1849.

To William Richter, of Williamsburg, Ia. for improvement in Ploughs. Patented Jan. 9, 1849.

To Benj. W. Warner of New York City, for improvement in Tailor's Shears. Patented Jan. 9, 1849.

To John B. Stanley of Near Utica, Miss. for improvement in Machines for gathering pea vines. Patented Jan. 9, 1849.

To A. Bancker and C. T. Alvord, of New York City, for improvement in the manufacture of hats. Patented Jan. 9 1849.

To Enoch Osgood, of Bangor Me. for improvement in Tooth Extractors. Patented Jan. 9, 1849.

To Benj. H. Green, of Princeton, N. J. for improvement in painting Telegraph wires. Patented Jan. 9, 1849.

To Chapman Warner, of Louisville, Ken. for improvement in moulding and compressing cores. Patented Jan. 6, 1849.

To Charles Danforth, of Patterson, New Jersey, for improvement in stop motion for drawing frames. Patented Jan. 9, 1849.

To Presby Norton and Franklin D. Cottle, of Tisbury, Mass., for machine for filing saws. Patented Jan. 9, 1849.

To B. F. Partridge, of Syracuse, N. Y., for improvement in Corn Ploughs. Patented Jan. 9, 1849.

To Joseph McCulley, of Philadelphia, Penn. for improved dies for bending tube skelps. Patented Jan. 2, 1849.

To Jno. D. Filkins, of Lima, Ia. for improvement in Bog Cutters. Patented Jan. 9, 1849.

To L. Dean and A. Higham, of Utica, N. Y. for improvement in Cast Iron Car Wheels. Patented Jan. 9, 1849.

To H. B. Sinclear, of Lyndenville, N. Y. for improvement in Ploughs. Patented Jan. 9, 1849.

To Wm. B. Treadwell, of Albany, N. Y. for improvement in Cast Iron Car Wheels. Patented Jan. 9, 1849.

To James M. Cook, of Taunton Mass., for improvement in Cast Iron Car Wheels. Patented Jan. 9, 1849.

To Henry Mellish, of Walpole, N. H. for improvement in Body Braces. Patented Jan. 9, 1849.

To. Edward B. Baker, of St. Philip Parish, S. C. for improvement in Cast Iron Car Wheels. Patented Jan. 9, 1849.

To James Hibbert, of Providence, R. I. for improvement in Knitting Needles. Patented Jan. 9, 1849.

To A. T. Converse and W. S. Cooley, of Norwich, Conn. for improvement in Cast Iron Car Wheels. Patented Jan. 9, 1849.

To Ephraim Harris, of Springfield Mass. for improved rotary blacksmith's Tuyere. Patented Jan. 9, 1849.

A Novelty.

A project has been started for bringing the Saratoga waters to this city in glass pipes. Notice has been given that an application will be made to the Legislature for an act of incorporation. The capital desired is $300,000—it is proposed to mould bricks with semi-cylindrical grooves in their sides, and in those grooves to place a glass tube, the space between the glass and bricks being filled with cement. The estimated cost of the work is $1.000 per mile, or $180,000 in the aggregate.

The project seems somewhat fantastic, but it may not prove so in the end. The object of it is to secure to the city benefit of the mineral waters of Saratoga.

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NEW YORK, JANUARY 20, 1849.

Improvements in Steam Navigation.

The mechanical and commercial world is sensitively awake to the importance of Ocean Steam Navigation. In respect to the superior construction of steam ships, men of the highest mechanical and scientific abilities are devoting their time to the subject. The navigation of the Atlantic by steam is no longer a problem—the rapidity of the passage is now the grand desideratum. It was once considered a great feat if a steamboat could stem the ocean wave at the rate of 6 and 7 miles an hour, now ten, twelve, fourteen and eighteen miles does not satisfy the spirit of modern transit. When the locomotive speeds along at the rate of 60 miles per hour, why cannot the steamship rush along upon its ocean pathway, at least at the speed of 20 or 30?

Eminent men, both at home and abroad, have been and are prosecuting different experiments to increase the speed of our steamers. Mr. Thomas Ewbanks of this city, the well known scientific author, has just published an account of a great number of experiments on paddles, relative to their figure, dip, thickness, material and number. The experiments were made in the Harlem River last year and they develope some very important facts which have been entirely overlooked by our nautical engineers. In the material of the paddles he recommends iron in place of wood, so that the blades may be made of the requisite strength with a diminished thickness from those in common use This is an important suggestion. He says "all paddle wheels are buoyant in proportion to their thickness and the propelling virtue of blades expands and contracts with their thickness. Thicken them on the wheel till they touch and they form a drum which can exert no more propelling power than a revolving grindstone—reduce them to the greatest thinness possible for strength and their propelling power is augmented."—"Compared to metal, wood is like a sponge, water clings to it. Extreme tenuity of blade is stamped with perfection by nature as seen by the reticulated bars in the wings of insects—by radial, angular, tapering ribs in the fins and tails of fishes. An uniformly thick, and unsupported slab like our paddles, is no where met with in nature." Some of our steamers present paddle wheels with blades in such numbers and of such thickness as to destroy at least 10 feet of an effective stroke every revolution, of the wheel, such as the United States with 36 split paddles of 2 1-4 inches thickness each, or 13 feet 4 in of a solid face.

In respect to the shape of the paddles, the experiments are very interesting Paddles of different forms, and of equal and unequal areas were fairly tested—the one class on the one side of the boat and the other class on the opposite side He found that triangular blades were twice as effective as the common rectangular kind. "There can be little doubt," he says "that the greater the velocity of as eamers wheels, the fewer within certain limits should be the blades." The lower part of the blades should have the greatest surface— let the surface be where it is of most effect—this is nature's plan and Mr. Ewbanks has proved it to be the best He predicts steel paddles will yet be adopted in preference to all others. His pamphlet is full of interest to every engineer. We have been informed that R. L Stephens, Esq. has lately made some important improvements, whereby the speed of the steamboat is not only doubled but tripled. The improvements consists in forcing air between two side keels on a flat bottomed boat giving her a buoyancy, and necessarily diminishing the resistance. We are not in possession of any of the positive experimental results of Mr. Stephens and therefore can say but very little on the subject.

GENERAL IMPROVEMENT IN STEAM SHIPS.

It used to be the custom to construct boiler flues of great length so that the smoke was kept winding round and round and allowing it to escape with difficulty. The plan now adopted, is to get as much fire as possible in the shortest space of time. This has been done by combining in the marine boiler, the properties of the locomotive one, having tubes of thin metal to evaporate a greater quantity of water in the same time as flues of the usual thickness, and thus having the advantage of doing more with less surface and less weight of metal. The change in the form of the engines, is not much varied from what it was 15 years ago. The newest steamers of the Cunard line, are fitted up with engines of the old fashioned, or lever kind. The great change is in the material employed in their construction. Formerly the greatest part of the engines were made of cast iron, now wrought iron is substituted with beneficial results.—The new ships of the Cunard line have their engines all made of the best wrought iron.—Ten years ago no sea steamer used the steam expansively, now it is generally worked in that manner with a saving of one fourth of fuel. Formerly the paddle wheels were driven very slow, about 240 feet per minute, now they are driven at an average rate of 300. In Britain about 8 years ago it was a fast steamer that could make 12 miles an hour, now it is common to see them running 16, 17, 18 and 20 miles an hour in short voyages. There has been quite a change made in the forms of their steam ships, a brief description of which will not be uninteresting The old vessels were built with the water line nearly straight and not with any hollow line in the bow, but now all have hollow lines and the vessels are propelled at a greater velocity with less power, because they rise easier over the wave.—The old plan was to build vessels 6 times the length of their breadth, now it is found that the greater the length the greater the speed, and the breadth necessary is just such as to enable the engines to be put in and to stow the requisite cargo. The greatest width of water line is now placed three fifths from the bow instead of being at the middle in the old way. The old cod's head bow too, is discarded, and instead of the old tapering fine run abaft, it is made more full above though still fine below, and thus there are more accommodations for comfort and a greater speed as the result. All the fast British steamers are built upon the wave line principle. Eighteen miles per hour is the greatest average speed in smooth sea water, not 30 as has been reported. There can be no doubt but we may expect in two years more to see our ocean steamers making at least an average speed of 15 miles per hour, and that will be making the passage to Liverpool in 8 days and 8 hours.

A State Mechanical School.

Governor Fish in his Message recommends the establishment of an Agricultural and Mechanical School by our Legislature. We have frequently recommended the instituting of a Mechanical Department by our Legislature for the reception of models and the handyworks of our ingenious mechanics. We suppose that the Governor has taken the hint; but he goes a step further—he wants a mechanical school established. We have no objections—it might be the means of doing a great deal of good, and then again it might not. The great objection which some have to urge against such an institution, is, "the probability of young men being educated there at the expense of the State whose parents are perfectly able to pay handsomely for their education elsewhere."—We have seen accounts lately of a daughter of the Hon. Millard Fillmore receiving her education at the Normal School in Albany.—We would need to have a great deal of faith, to believe that she ever intends to be a District School Teacher. We heartily endorse the sentiments of Gov. Fish both in respect to the Agricultural and Mechanical School, we only want it well managed—not to be a *side* college for the children of the rich, as too many of our public institutions have become, but to be open particularly to the sons of working men. The children of the rich who wish to learn mechanical trades should go into the workshop for that purpose. Having a better education than the children of working men, they will exert a healthy influence on the manner and mien of their poorer mates, and thus give a more elevated tone to their manners. On the other hand, the children of working men who may receive an education at the State Mechanical School, will no doubt become more polished than if their junior class was in the foundry or workshop.—In this manner, we would have a mixing up of elements which would tend to the general elevation of our working classes. As they are the "bone and sinew" of the commonwealth, we hope our legislators will not forget that their joints need frequently to be lubricated—and the purer the lubricating substance, the smoother moves the machinery.

Magnetic Astronomical Clock.

The Secretary of the Treasury transmitted to the Senate on the 3d inst. a valuable Report from the Superintendent of the Coast Survey, containing the report of the assistant charged with the telegraph operation for longitude, which was an application of the galvanic circuit in connection with the astronomical clock and telegraph register to record the occurrence of astronomical phenomena. Sears C. Walker, Esq., the assistant, in his report states that the magnetic clock was a valuable acquisition to the coast survey. The "mechanical invention," he states, "of making a delicate astronomical clock to make and break the circuit every second was made about 1841 by Professor Wheatstone an Englishman,—he used the clock to make others on the same line mark the same second.

Dr. Locke's invention differs from all that preceded it. It is made to graduate the hours, minutes and seconds of time on the running fillet of paper of Morse's Telegraph Register. In Coast Survey operations for longitudes, the dates of astronomical events are imprinted on the graduated paper by striking on a break circuit key, which inserts a corresponding break circuit space on the intended line of the automaton clock register. This may be read off to the hundreth of a second. The astronomer never hears the clock beat, nor sees the clock during the operation; in fact, it may be a thousand miles off, which would make these operations inconvenient. He never wastes time in writing down the dates.

As he can use his eye and finger with great rapidity, he may impart a signal every second if he wishes. Two seconds of time are spoken of as enough for the equatorial intervals of the wires of a transit instrument. These are divided into distinct groups or tallies of five each. One tally is the ordinary number in use by the common method. By the printing method of the Coast Survey nine of these tallies may be manipulated in the same time. Each single manipulation is more precise than the ordinary mode of observing with the eye, ear and pen. All these sources are estimated as giving a gain of ten fold, either in time of obtaining results, or in accumulation of them in a given time.

The report estimates that by the Coast Survey method the Greenwich Observatory may turn out every year as good a catalogue of right ascensions of stars as those now made from ten years' work.

In such catalogues as are now made at Munich, Roen, and Washington a talley of printed results may take the place of a single one, and a fivefold increase of precision be effected"

In respect to the first inventor of the Telegraphic Clock, we believe that Mr. Walker is mistaken. Mr. Wheatstone has the good fortune of Professor attached to his name as a telegraph inventor, and this seems to be enough to dub him as the author of an invention which was secured by a patent to a London mechanic in 1841—not Professor Wheatstone, who endeavored to appropriate the invention, but signally failed—his clock, from want of practical knowledge, being constructed in such a manner, as to produce effects in clock work, like music from the performance of Deacon Dakin's old cow on the trombone.

The California, American Steamship.

This fine vessel which left this port on the 6th of last October for the Pacific Ocean, has proved herself to be a good vessel. She made the passage to Rio Janeiro, a distance of 5000 miles, in twenty five days. The engines worked well and no accident occurred during the voyage.

California Gold.

The gold excitement is as strong in our city as ever. In one day last week ten vessels sailed from this port. In some the accommodations were indeed miserable but the emigrants all appeared to be in high spirits.—Among the myriads bound for California there are a great many very reckless and unprincipled men, but the majority we believe are well behaved citizens, in fact, no person can get there without having been able to lay up a few of the dollars and cents. There are some of the most respectable of our citizens leaving the city for San Francisco, men of known character, intelligence and enterprise. These are just the class of men to prosper there and do good to themselves and others.—Hardships will be experienced for awhile, but it is to be hoped that they will be remunerated for their pains.

Throughout the Southwest. in fact throughout all the States, the accounts that reach us contain evidences of the gold fever raging in almost every hamlet. It is calculated that no less than 150,000 emigrants will be on their way to California from the States in two months. What an army to support, yet every veseel is well stored with provisions. If the mountains and valleys of old California don't get a raking by next January, then it won't be for want of diggers.

Patent Case.

On the 8th inst. before Judge Kane in the U. S. Circuit Court, Philadelphia, the jury gave a verdict of $438 08 against Murphy, in favor of Dyott, for the infringement of a patent for a camphene lamp. Judge Kane appears to do more patent business than all the rest of our judges put together.

On the 10th inst. before the same Judge, the case of O. H. Parker vs. A. M. Perkins for the infringement of a patent right to a water wheel, was brought up, but the plainti suffered a nonsuit.

The Steamer Europa's Mail last week consisted of twenty eight thousand letters, and seventy bushels of newspapers. The postage on the letters, to be paid to the Cunard line and the British government, amounted to $5,-320. We hope yet to see an "Ocean Penny Postage" system adopted between the two governments.

The Postage charged on letters, was six cents, and on papers one cent. Postage was offered in advance on newspapers, through to their point of destination, but refused by the Post office.

The $100 Prize.

We suppose that many of our subscribers are girding their loins for this literary strife. The Essay is not a long one—clearness and brevity is required, and the earlier the Essays are forwarded, the greater favor will be conferred on us. In adducing cases of proof, to point out the necessity of changes in the existing Patent Law, facts should be stated, as they "are sturdy things and cannot be refuted."

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A few more copies of complete sets of vol. 3 of the Scientific American may be had at the office, either bound or in sheets. Price neatly bound $2 75, in sheets suitable for mailing $2. The second volume minus 4 numbers from being complete we can furnish for $2 bound, or in sheets and mailed at $1 50. Send in your orders early if you desire them filled for we have but a few more copies left of either volume, and the number is growing less every day.

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The Art of Insects.

BY KIRBY.

The lord of creation plumes himself upon his powers of invention, and is proud to enumerate the various useful arts and machines to which he has given birth ; not aware that "He who teaches man knowledge," has instructed the despised insects to anticipate him in many of these. The builders of Babel doubtless thought their invention of turning earth into artificial stone, a very happy discovery ; yet a little bee had practised this art, using indeed a different process on a small scale, and the white ants on a large one, ever since the world began. Man thinks that he stands unrivalled as an architect, and that his buildings are without a parallel among the works of the inferior order of animals. He would be of a different opinion did he attend to the history of insects ; he would find that many of them have been architects from time immemorial ; that they have had their houses divided into various apartments, and containing staircases, gigantic arches, domes, colonnades, and the like ; nay that even tunnels are excavated by them so immense compared with their own size as to be twelve times bigger than that projected by Mr. Dodd to be carried under the Thames at Gravesend. The modern fine lady who prides herself on the lustre and beauty of the scarlet hangings which adorn the stately walls of her drawing room, or the carpets that cover its floor, fancying that nothing so rich and splendid was ever seen before, and pitying her vulgar ancestors, who were doomed to unsightly whitewash and rushes, is ignorant all the while, that before she or her ancestors were in existence, and even before the boasted Tyrian dye was discovered, a little insect had known how to hang the wall of its cells with tapestry of a scarlet more brilliant than any her rooms can exhibit, and that others daily weave silken carpets both in tissue and texture infinitely superior to those she so much admires. No female ornament is more prized and costly than lace, the invention and fabrication of which seems the exclusive claim of the softer sex. But even here they have been anticipated by these little industrious creatures, who often defend their helpless chrysalis by a most singular covering, and as beautiful as singular, of lace. Other arts have been equally forestalled by these creatures. What vast importance is attached to the invention of paper ! For near six thousand years one of our commonest insects has known how to make and supply it to its purposes ; and even pasteboard, superior in substance and polish to any we can produce, is manufactured by another. We imagine that nothing short of human intellect can be equal to the construction of a diving bell or air pump—yet a spider is in the daily habit of using the one, and what is more, one exactly similar in principle to ours, but more ingeniously contrived ; by means of which she resides unwetted in the bosom of the water, and procures the necessary supplies of air by a much more simple process than our alternating buckets—and the caterpillar of a little moth knows how to imitate the other, producing a vacuum when necessary for its purposes, without any piston besides its own bony. If we think with wonder of the populous cities which have employed the united labors of man for many ages to bring them to their full extent what shall we say to the white ants which require only a few months to build a metropolis capable of containing an infinitely greater number of inhabitants than even the imperial Nineveh, Babylon, or Pekin in all their glory ?

That insects should thus have forestalled us in our inventions, ought to urge us to pay a closer attention to them and their ways than we have hitherto done : since it is not at all improbable that the result would be many useful hints for the improvement of our arts and manufactures, and perhaps for some beneficial discoveries. The painter might thus probably be furnished with more brilliant pigments, the dyer with more delicate tints, and the artizan with a new and improved set of tools. In this ast respect insects deserve particular notice. All their operations are performed with admirable precision and dexterity ; and though they do not usually vary the mode, yet that mode is always the best that can be conceived for attaining the end in view. The instruments also with which they are provided are no less wonderful and various than the operations themselves. They have their saws, and files, and augurs and gimlets and knives and lancets, and scissors, and forceps, with many other similar implements ; several of which act in more than one capacity, and with a complex and alternate motion to which we have not yet attained in the use of our tools. Nor is the fact so extraordinary as it may seem at first, since "He who is wise in heart and wonderful in working," is the inventor and fabricator of the apparatus of insects ; which may be considered as a set of miniature patterns drawn for our use by a Divine hand.

Heat and the Human Body.

The human body is by some inscrutable arrangement supplied with an internal fountain of heat by which its temperature is maintained over the air which usually surrounds it. The fountain of heat owes its origin to the same unknown principle as organization itself. The fact of its existence and that it is capable of supplying a certain quantity of the calorific principle, are all that we can know. This amount of heat is essential to the well-being, health and comfort of the human body : if we lose it too fast the sensation of cold is produced, if it is not suffered to pass away at all, we become sensible of fever. The atmosphere is subject to various vicissitudes of heat and cold and from both man is compelled to defend himself. How shall he do it ? He surrounds himself with clothing, made of non-conducting materials, such as flannels, cotton, &c. The effect of this is to keep the body at its natural temperature by placing a barrier between it and the atmosphere—not allowing the heat of the body to pass off from the surface. If the external air on the other hand be hot, the same covering which prevents the natural heat from passing away, hinders the external heat from entering. Hence in hot climates as well as in cold persons are accustomed to wear flannel clothing, to produce opposite effects in the two cases.

Nothing is more conducive to the regular temperature of the body than free evaporation. The surface of the body is an admirable piece of mechanism. The skin is an instrument to which few at present have given the attention it deserves. It is filled with minute capillary tubes, which continually send forth the effluvia which ought to escape. If you cover the body with a substance which is a non-conductor not only of heat but also of air in seeking to preserve the regular temperature of the body, you obstruct the escape of those principles which ought to pass freely away. Hence flannel is mostly used for clothing as its pores are open and the air readily passes while heat only makes its escape thro' it with reluctance and difficulty. When we inspire, the air taken into the lungs undergoes a change, with the nature of which we are not acquainted ; this we know, that when it is expired its nature is changed and it has acquired the qualities of carbonic acid gas. We find that this result also illustrates the function of the skin. If you take a wine-glass, or tumbler and inverting it on the skin hold it firmly for a short time the air in the glass will be found to have undergone a change analogous to that which is breathed from the lungs : a candle thrust into it will immediately be extinguished. From observations of this kind it is evident that the whole surface of the body is, as it were an extension of lungs, dealing with the atmospheric air in the same manner with them, though with considerable less energy. Whatever change the lungs effect on the oxygen of the air brought into contact with them is effected by the skin in a feebler degree on all that gets access to it. How necessary then is good ventillation to apartments.

Hasty Judgment.

Coleridge tells a story of meeting a stranger whose silence during dinner time, and his attention to what others said, without interrupting them, gave him a favorable impression of his understanding ; till, unfortunately on the appearance of some apple dumplings towards the close of the repast, the delusion was dissipated by the stranger suddenly exclaiming—"Them's the jockeys for me !"

Manufacture of Paper Pulp from Straw.

The straw or other vegetable fibrous material, is heated or boiled with milk of lime twelve hours, in a suitable boiler, and the lime and coloring matter washed out in a suitable tub. The fibrous matter is then transferred to millstones, so arranged as to crush it, and at the end of this operation the pulpy matter is again transferred to another tub for further washing out the coloring matter. The pulpy matter is next removed to a second set of boilers, where fresh lime-water and an alkaline solution of the strength of two to four degrees of the hydrometer is supplied, and the heat continued for six hours.

At the end of this time the whole liquor and pulp are forced up by steam pressure into a third washing tub, where it is washed and sulphuric or muriatic acid of the ordinary strength used for bleaching purposes, is supplied, and the contents kept in agitation for two hours, and the acid is then entirely washed out. The pulp is next returned to the second set of boilers, where it is mixed with alkali of the strength of two to four degrees of the hydrometer, and boiled four hours, or until the alkali is spent.

The pulp and liquor are again forced up into the third washing tub, and all soluble matters washed out of it. Chloride of lime of the ordinary bleaching strength is now added, and agitation kept up some two hours longer ; when steam is let on and the boiling continued until the salt is spent, when the whole is discharged into the fourth tub, where the spent chloride of lime is washed out. The pulp is now subjected to the operation of souring, which consists of submitting it to the action of acid and water of the usual strength used for bleaching, and keeping the whole in agitation for four hours. It is now ready to be discharged into a fifth tub or set of tubs, when the process is considered as completed.

To Keep Sweet Potatoes.

Give them ventilation from the bottom, without exposing them to extremes of temperature on the surface. Within any out-house, dig a dry cellar, say seven feet square, and as deep as you wish. If you can put a wall on the sides, of a single brick in thickness, and a brick pavement at the bottom it will be all the better on several accounts. The material point is this, insert an upright trunk into the centre of this cellar, formed by nailing together four boards, of a foot in width, each side being thickly perforated with augur holes, from bottom to top. Let your potatoes be carefully handled, to avoid bruising, either by foot or hand, or any other rough usage. Pile them up around the trunk, using a ladder to ascend and descend or to stand on. When your cellar is full, let them stay uncovered till they pass through the saccharine fermentation or sweet, as it is called. On the occurrence of the first cold weather, pour dry sand on the level surface of your potatoes ; allowing it to percolate into the mass as far as it will, by mere pouring until the sand has entirely hidden the potatoes from view. The mouth of the trunk must be above the potatoes, and kept open. The bottom end should be notched. Any fixture which will secure dryness, ventilation from the bottom at intervals of not exceeding three feet through the mass, and protection from the change of temperature on the surface, will secure the object.

Soldering Iron.

When the filings of soft cast iron are melted in a crucible with borax, which has been previously calcined in order to get rid of the water it contains, a hard, shining, black pitch-like soldering substance is obtained, being glass of borax coloured black with iron.

Sal ammoniac having been applied to the internal joining, or between the overlapped edges of thin sheet iron, some of this black solder being powdered is to be laid along a short portion of the joint, and as soon as it is melted over a clear forge fire, the soldered part is to be placed on the beak of an anvil, and beaten with a light hammer and quick hand, as long as the heat permits. More of the powder is then to be laid upon the adjoining part of the joining, until the whole of the seam is soldered.

Another method, which has been published for this purpose, is to melt five ounces of borax in an earthen crucible, and when melted, to add half an ounce of sal ammoniac, and pour the melted matter upon an iron plate When cold, it will appear like a glass, and is to be powdered and mixed with an equal quantity of unslacked lime.

The iron or steel being heated to a red heat a little of the above powder is to be sprinkled on the surface, where it will melt like sealing wax. The iron or steel is then to be again heated, but considerably below the ordinary welding heat, then brought to the anvil, and hammered until the surfaces are perfectly united.

Cochineal.

The true Cochineal insect has never been found in the East Indies. It is indigenous to Mexico. The British East India Company were so desirous to have it introduced into their eastern possessions, that they some years since offered a reward of £6000 to any person who might succeed in cultivating and rearing this insect in India. The king of the Netherlands also went to pains and expense to introduce the Cochineal insect into Java, the climate of which is supposed to be well adapted to this important article of merchandize ; but we believe that all attempts to introduce it into the countries of the east, have hitherto proved unsuccessful.

This insect will yet be a source of great profit to the United States, for there is no doubt but within our boundaries, it will be raised in great quantities. It produces the most brilliant scarlet dye upon silk and wool—nothing can equal it. It is also a beautiful paint—the most brilliant of all the *lakes*.

TO CORRESPONDENTS.

"J. D. R. of Del."—The Railroad Signal Telegraph to which you refer, is the most ingenious invention that we ever saw. It is a disk full of intersecting circles, and a sentence painted at every intersection, such as "stop five minutes," "wooding up," "broke the crank pin," &c. Now just by turning a pointer to any sentence at one station, in a moment the pointer signals the same sentence at the other station. The shape and arrangement of the cutter knives is common. They are manufactured at Hackensack, N. J. The feeding arrangement of yours is different—the others using spur wheels on the fly wheel shaft to drive fluted rollers that feed the straw to the cutters. It is difficult to tell whether you could secure a patent or not. On the essential points of original difference you could —these we do not know. Your feed cutter is new.

"J. S. of Ky."—We do not differ to the quantity of water discharged when the wheel is, and is not in motion. The note referred too had no reference to the water passing through the issues when the wheel was not in motion, but merely through the *draft*, it cannot discharge more than it receives. You will see the difficulty we sometimes have in answering questions, because of indefinite, and unpointed propositions. What is the reason of so many different opinions among milwrights relative to reaction wheels—not two agreeing in principle and none but Whitelaw daring to define the same as an author. Where are the rules for their construction to be found explained upon mechanical principles? The other matter, we shall notice in a short time.

"J. B. W. of S. C."—Either of the water wheels of which you mention are very good but for the purpose that you desire one we should recommend to you Haviland & Tuttle's. The "centre vent wheels" are not expensive and they can be placed in a compact form for shipping, which is another desirable consideration to a distant purchaser. The best model of a wooden bridge with which we are acquainted was represented in No. 24 vol. 2 of the "Scientific American" (a copy of which we sent you). G. M. Thayer Esq. of Springfield, Mass. is the inventor and to whom we would refer you for further particulars. Address Haviland & Tuttle at South Boston, Mass. $3 received all right.

"J. D. of Del."—There is but little doubt as to your being able to procure a patent on your principle for a Straw Cutter. We do not think the fee for attending to the whole of

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your business, including $30 for the Patent Office, would be $50. Please send us a model

"G H. of O."—It is not in our power to furnish you with such drawings as you describe. We can send you an excellent work on Pleasure Carriages for $3, but the styles represented in it might not suit you.

"G. D. of N. Y."—We do not understand by your letter to which engine you refer. The one of 16 horse power advertised a few weeks since has been sold, and those of 5 horse power have no boilers belonging to them.

"C. V. of Tenn."—We have referred the case of your inquiry to the inventor of the best machine that we are acquainted with, and probably he will write to you in a few days. The dollar has been placed to your credit on the Scientific American.

"R. Z. P. of Mass."—Your order was filled and the books forwarded by Adams & Co.'s express last Saturday.

"C. P. B. of Knox."—The clocks and such works are polished by pumice stone, rotten stone and whitening. Two or three coats of copal varnish neatly laid on first and each suffered to dry, then it is rubbed down, varnished with the finest varnish, dried and polished with the fine pumice stone and finished with whitening—or what is better, "Tripoli."

"W. H. of Pa."—You will see in the Editorial page a notice of the same thing invented by J. L. Stephens. We assure you that we have doubts of its success. We think that the great improvements yet to be made must be in the hulls and in the paddles. Fowls have buoyancy but they cannot move like fish.

"A. of New York."—We are not aware of any engine in operation moving itself by compressed air—(compressing its own air.) Atmospheric railways have been tried—and engines (machines) moved by compressed air, but this compressed by a steam engine. No machine can compress its own air and move itself by *that* air—this would be perpetual motion.

"J. S. of Ky."—The Examination should be held in about one month. You can sell rights now as a common bargain. Every subject is taken up in its class The Patent Office will fairly examine it in its order.

"C. B. H. of N. Y."—We accept of your proposal and will publish an engraving of your machine in 2 or 3 weeks. $2 received all right.

"S. S. of Pa." and "J. R. of S. C."—Your orders have been both received and each letter contained the amount of funds specified. The machinery will be forwarded immediately and bills of lading sent to you by mail.

"J. E. W. of O."—Your telegraphic communication was received but they inform us at the Northern Hotel that they know nothing of any model or money for us.

"C. D. G. of Ala."—We are glad that the Camera Lucida which we sent you pleases you so well. The 2 last which you ordered have been sent by the schr. "Delmonaco," we shall be able to furnish you with any quantity that you are inclined to order hereafter.

"I. Van K. of N. Y."—Your specification was duly received and it has been forwarded to the Patent Office with the drawings and fee. The claim which we made for you was as broad as we thought it expedient to make it.

"S. and J. of Ill." "C. B. F. of R. I." and "H. G C. of Ky"—The specifications and drawings of your several machines with fees have been sent to the Commissioner, and the models will be forwarded on Monday next.

"C. D. G. of Miss."—There is no good reason why your invention should not have received a patent and we are confident that it must have been rejected for want of proper application. If you will send your model here we will make a new application for you and unless we succeed in securing it we will make you no charge. $5 received all right.

"J. T. of Mass."—We have received your drawings and letter. We are very doubtful of your success, although we hope you may be rewarded according to your enterprize. We will not utter words of hope least we might excite you to an expence never to be returned. We will believe when we see you here sailing around our city above us, and be ready to acknowledge that we judged too hastily. In a short time we will publish the theoretical principles of navigating the air—there are fixed laws for these things which must not be overlooked.

"H. P. P. of S. C."—Your letter of the 10th was received with the $20 safely enclosed. The "Camera" was shipped on the 13th and a bill of lading sent to you by mail. Your other wants shall be attended to

"Admontes."—We must have your true name or we cannot give your letter attention.

"A. J. of Maine."—We will give your communication further attention—at present we have an indistinct recollection of having met with something of the same nature before, but we may be mistaken.

"J. A. & Sons of Ms."—Your specification has been forwarded to Washington with the fee and model. It is optional with you, whether you have an engraving published before the patent is granted or not but if you desire to introduce your machine now it will be better to publish it at once. You need have no fear of invalidating your claim by its publication *in* the "*Scientific American.*"

"W. W. of N. C."—We had anticipated your wants, and sent a copy before your letter was received. The map previously sent you cost 50 cts. We will reply to the rest of your enquiries by letter in a few days.

A Curious Case of Collision.

In the Supreme Court of Louisiana, there is a case now on trial, originating in the flood of 1844, when the whole valley of the Mississippi was some ten or twenty feet under water.

"The Belle Air steamer was coming down the river under a full head of steam, and as she neared the respectable little town of Chester in Illinois, "feeling her oats," and having a desire to test the solidity of Illinois building she pitched head foremost into a three-story brick building in Chester and knocking off the top story proceeding onward *plenum sed*, against a four story stone mill, and knocked it into a cocked-hat. After performing these extroerdinary exploits the Belle Air proceeded on her journey, with scarcely a scratch or mark of the affray in which she had been engaged and arrived safely in New Orleans. The owners of the two damaged buildings have sued for damages of which they recovered $3000 in the Court below—The witnesss in the case expressed some opinions which were rather remarkable. One of them spoke of the buildings injured as being very pleasantly located, though they were twenty feet under water. From this opinion we may presume what is regarded as a favorable location in Illinois. The witness in expressing this opinion had in view no doubt the fine water privileges of this location.—Another witness very navely thought the Belle Air was not to blame at all, but that it was the fault of the houses which had no business out in the middle of the current. The case was ably argued by Mr. Randall for plaintiff and Benjamin and Upton for defendant."

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THE engine and boiler represented in No. 9 of present vol. of the Scientific American is again for sale. Several opportunities for disposing of it have been offered and refused in consequence of its having been sold to a gentleman from the coutry but now he expresses his ability to meet the terms which we require (cash in advance) and the engine is therefore offered for sale again. Any person now desiring it can have it shipped to his address for $150 cash which is $25 less than it is actually worth. Address MUNN & CO.
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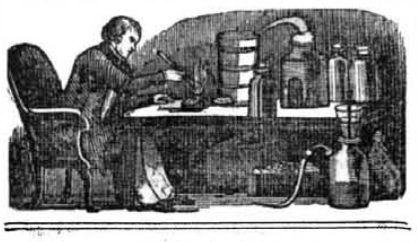


For the Scientific American.

Poisonous Metals.---Their Effects and Antidotes.

ARSENIC.—Of all poisons Arsenic is the most important, owing to its cheapness and the ease with which it can be procured. It is therefore the most commonly used for criminal purposes, and the records of crime are sad evidences of this fact. In England especially, within the past ten years the number of deaths occasioned by willful poisoning have been the cause of serious alarm—no less than 185 cases having occurred in two years. This disclosure has led her chemists to pay particular attention to the methods of detecting the compounds of this metal with organic mixtures. Their investigations have been richly rewarded and the detection of a 144th part of a grain of arsenious acid in gruel, milk and beer can now be effected.

Arsenous acid is without smell and almost without taste, though if kept for some time in contact with the tongue it first tastes a little bitter and then leaves one of sweetness. This is what Dr. Christisson says about it, although Professor Orfila says " it has a rough slightly styptic taste, perceptible after a few seconds, and attended with salivation. On the whole, however, it is to be regretted that this dangerous acid is so devoid of taste, for most persons who have swallowed it either by accident or design were not aware of any taste in the food or drink in which it was administered When arsenic acid crystalizes out of an aqueous solution, it greatly resembles pounded sugar. It does not dissolve well in water only 1 part to about 1000 of cold water, and 1 part to 400 of warm water. The presence too of any organic substance in a liquid impairs its solubility, for Dr. Christisson, to whom the world is indebted for his researches into poisons, found that a cup of tea left beside the fire at the temperature of 200° for half an hour upon two grains of the arsenic, did not dissolve that quantity.

The quantity of arsenious acid necessary to destroy life, has been variously stated. Some have said that two grains may prove fatal to a man. The smallest fatal dose on record, however, is two and a half grains, which destroyed a child four years old in six hours. The smallness of the fatal quantity is not exactly known—some are more easily affected than others, and even half a grain may produce alarming consequences. " It is very likely," says Mr. Taylor, " that three grains will prove fatal to an adult,"—the cases on record warrant this conclusion, and in one instance a gentleman who took two grains in a glass of port wine came very near expiring from its effects and there is every probability it would have proved fatal, only it was received on a full stomach. By certain mechanical mixtures arsenic in moderate doses may be deprived of its poisonous properties, " If certain insoluble powders, such as clay," says Orfila, " be introduced into the stomach immediately after arsenic has been swallowed, the violent effects may be greatly mitigated," if not altogether prevented, the cause of which appears to be referrable to the envelopment of the arsenical powder by the inert substance, and the consequent prevention of its coming into contact with the membrane of tha alimentary canal. Dr. Christisson observes that the sparing solubility of arsenious acid occasions its influence to be in all cases very greatly modified by the condition of the stomach as to food at the time it is swallowed. If the stomach is empty, it adheres to the villous coat, and acts with great energy. If the stomach be full at the time, the first portions that come in contact with the inner membrane may cause vomiting before it be diffused, so that the whole or greater part is discharged. There are more than two or three instances on record of half an ounce taken after a hearty meal without having proved fatal, or causing serious mischief. On the other hand there are a number of cases on record, where less than this has proved fatal although taken on a full stomach. In all cases it is a dangerous substance if taken internally in the smallest quantities.

ANTIDOTES.

There is but one substance known, which can at all be considered as a chemical antidote to arsenic, viz. the hydrated sesquioxide of iron. This should be kept in readiness in every druggist establishment, as it takes some time to prepare it. The quickest way to make it, is to dissolve the common anhydrous sesquioxide of iron in weak sulphuric acid aided by a gentle heat, then decompose the hot solution with an excess of strong ammonia, filter off the fluid by means of a cloth filterer, then wash the precipitate well with warm water, letting it drain thoroughly, squeezing out by compression as much of the water as possible. This substance must be administered in large quantities, it having been ascertained, that in order to remove one part of arsenic from a state of solution, 12 parts of the oxide in a moist state are required, and 60 parts, if it has been previously dried; the presence of ammonia, is also necessary to effect an insoluble combination with the arsenic. Berthold and Bunsen considered this an effectual remedy, even when given some time after the arsenic was swallowed.

Other physicians again state, that the only effectual antidotes for the arsenic, are emetics and the stomach pump. It is on them that we would more firmly rely in severe cases. The use of the oxide of iron should also be combined with the pump and emetics, likewise muciliginous liquids, as these serve to sheath the coats of the stomach from the action of the arsenic. When any poison is taken, either by mistake or design, the first knowledge of the fact should be met with a table spoonful of mustard dissolved in a bowl of warm water and swallowed as rapidly as possible for an emetic. A doctor should at once be sent for, and if the oxide of iron is at hand use it freely.

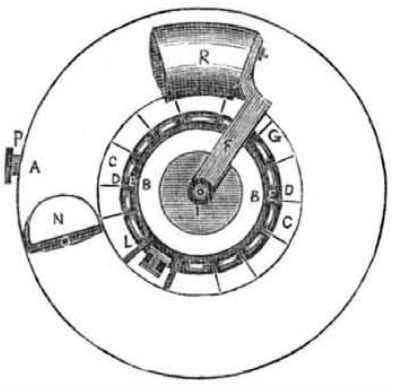
The tests of arsenic next week.

History of the Rotary Engine.

Prepared expressly for the Scientific American.

CLEGG'S ROTATIVE ENGINE.

FIG. 35.



This is Mr. S. Clegg's engine patented in 1809. Fig. 35 is the underside of a circular piece of cast iron, and of a diameter and thickness proportioned to the size of the engine. I is the common centre of the different circles shown on this piece. With any convenient radius less than that of A A, described the circle C C, and within the latter the circles D D and E E,—the radius of the latter being the least of those now named. From the use of these parts, an idea of their relative dimensions will readily be inferred. Let that part of the surface A B, A B, which is contained between the circles A and C, be plain. Between the circles C and D sink a circular groove C D of any given depth; and between the circles D and E let another circular groove be cut of the breadth D E, and of any given depth less than that of the groove C D. Let the remaining part of the surface A B, namely, that included between E and B, be cut down to any depth less than the depth of the groove D E.

Into the groove C D let such a number of segments of a circle be fitted as shall form a complete circle, excepting the space at L, which is occupied by adjusting screws or springs, to keep the segments close together. The segments are the breadth (or nearly) of the groove C D, and of a depth less than the depth of the groove C D. Those sides of them which apply to each other are to be ground together plain, and air-tight if possible. Their under surfaces, are to be flat, so that the whole may form one complete plain surface, excepting the space which is taken up by adjusting screws or springs L, which screws or springs are placed so far below the surface as to let a roller pass by them.

FIG. 36.

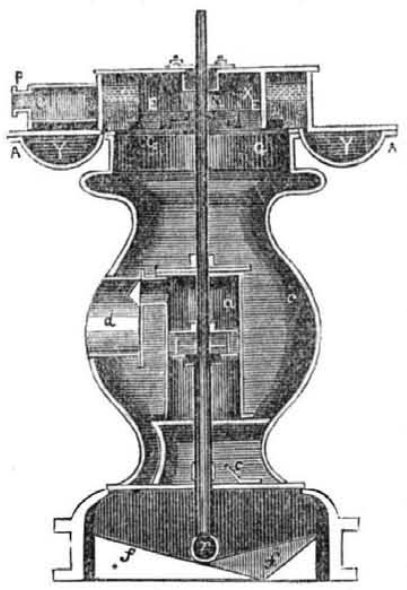
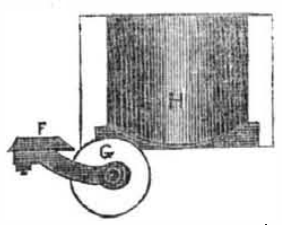


Fig. 36 represents a vertical section of the plate and grooves of Fig. 35, resting upon a circular chamber or hollow space Y Y, to which chamber the said plate forms a light covering, excepting that space occupied by springs or screws L L, as before mentioned. I the centre of all the grooves and circles before described, is also the centre of the shaft. On the shaft I, is fastened a plate or coupling Z, in which is inserted a bar F: this bar may be of any given breadth, but in depth must be less than the depth to which the circle E B was cut below the surface A B; to this bar is attached a wheel or roller G, shown in Fig. 37 upon a large scale. The manner in which it is attached to the bar F is also there seen, and it is so attached to it that the top of the wheel or roller G shall always be higher than the top of the bar F. The wheel G, being attached to the bar F, will, when the bar is made to revolve, describe a circular path H H H, along the plain surface of the segments. Let that portion of plain surface of each segment which answers to the path of the roller G be rounded off, in such a manner as to make that portion of the surface an arc of a circle, the convex circumference of which is presented to the roller G. In Fig. 37, at H, is shown a perpendicular view of one of the segments, rounded off in the manner described, and presenting its convex circumference to the roller G. There may likewise, be another roller attached to the bar behind it, to lower down the segment in the same manner in which they are raised by the first roller. Now it is obvious, all the said segments being in their places in the groove C D, Fig. 35, that the roller G, in performing a revolution round the centre I, must travel along a series of convex arcs of circles, equal in number to the number of segments in the groove C D. The groove D E is, in fact a recess in the deeper groove C D, and may if necessary, be filled with hemp or tallow or any other material which may answer the purpose intended.

FIG. 37.



Each segment projects over the facing O O on both sides; their projection on the one side completes the cover over the hollow chamber, and the other is the rounded surface for the roller to lift them. The facing O O is exactly or as nearly as can be, level with the underside of the plate A B A B, when the plate is on its place, as represented in Fig. 36; so that when the segments are all in their places, they complete the semi-circle chamber, and fit so close on their seats and in the groove, that were the chamber to be filled with any elastic fluid, they would prevent its escape, or nearly, excepting where the space is left for the springs or adjusting screws.

In Fig. 36 C is the condensing vessel, *a* the air pump *b* the air pump buckets, *d* the hot water cistern, *e* the clack. *f f*, the inclined plane for working the air pump bucket, is fastened in the shaft, and consequently revolves with it. To the air pump is attached a hollow tube through which the shaft goes. To this tube is fastened a cross bar, at each end of which is a roller *r*, resting upon the inclined plane: of course when the plane revolves the bucket rises and falls The plane is divided into two different angles, so as to make it more acute where the bucket rises, but nearly an angle of 45° where the bucket descends, as represented in the drawing. The injection enters the groove above the blocks, and keeps about three inches of water upon them: the injection then enters the condenser out of the groove, as seen at X. Each segment or block, K, is of sufficient weight to resist the pressure against that part of their under surface which is over the semi-circular chamber, and will generally be about five-eights of an inch. The blocks may be likewise lifted exactly in their centre of gravity by means of a lever in the upper part of the groove, and worked by a roller or small inclined plane fastened to the shaft, as represented by the dotted lines.

Antidote to Strychnia.

Dr. Isaac Piddock of London, recommends camphor as an effectual antidote to the terrible poison, strychnia. The recommendation however is founded merely upon a single case in which a man who had by mistake swallowed one-fourth instead of the one-sixteenth of a grain, which was prescribed for neuralga, and was convulsed in consequence with tetanic spasms, was almost immediately relieved by a dose of five grains of camphor dissolved in almond mulsion.

To Cook a Ham.

Boil a common sized ham four or five hours then skin the whole and fit it for the table; then set in an oven for half an hour; then cover it thickly with pounded rusk or bread crumbs and set it back for half an hour.—Boiled ham is always improved by setting it into an oven for near an hour, till much of the fat tries out, and this also makes it more tender.

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